The Effect of the Reciprocal Teaching-Learning Model Assisted by Flash Card Media on the Science Knowledge Competence

I Gusti Ngurah Gede Agung Indra Kasuma
Faculty of Education, Universitas Pendidikan Ganesha, Singaraja, Indonesia
e-mail: gungindra5@gmail.com

I Komang Ngurah Wiyasa
Faculty of Education, Universitas Pendidikan Ganesha, Singaraja, Indonesia
e-mail: ngrh.wiyasa.@undiksha.ac.id

A R T I C L E I N F O

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A B S T R A K

Rendahnya kompetensi pengetahuan siswa yang disebabkan karena siswa mengalami kesulitan dalam belajar dan kurang berperan aktif ketika mengikuti pembelajaran di kelas. Tujuan penelitian ini yaitu untuk menganalisis pengaruh model pembelajaran *reciprocal teaching* berbantuan media flash card terhadap kompetensi pengetahuan IPA siswa kelas IV SD. Jenis pada penelitian ini ialah eksperimen semu dengan menggunakan rancangan non-equivalent control grup design. Populasi pada penelitian ini sebanyak 266 siswa. Sampel diambil menggunakan teknik cluster random sampling untuk menentukan kelompok eksperimen dan kelompok. Pengumpulan data untuk kompetensi pengetahuan IPA menggunakan instrumen tes. Data yang diperoleh kemudian dianalisis menggunakan uji-t polled varians. Berdasarkan analisis data, didapatkan thitung = 5,250 > ttabel = 2,000 pada taraf signifikansi 5% dengan dk = 65, sehingga, H0 ditolak dan Ha diterima. Jika dilihat dari nilai rata-rata (means) kompetensi pengetahuan IPA kelompok eksperimen lebih dari kelompok kontrol yakni 0,545 > 0,297. Sehingga dapat disimpulkan terdapat pengaruh yang signifikan model pembelajaran *reciprocal teaching* berbantuan media flash card terhadap kompetensi pengetahuan IPA siswa kelas IV SD. Model pembelajaran *reciprocal teaching* berbantuan media flash card dapat meningkatkan kompetensi pengetahuan IPA siswa kelas IV SD.

A B S T R A C T

This study aims to determine the effect of the reciprocal teaching learning model assisted by flash card media on the science knowledge competence of 4th grade students of SDN Gugus II Kuta in the academic year 2019/2020. The type of this research is quasi-experimental using a non-equivalent control group design. The population in this study were all students of class IV SDN Gugus II Kuta as many as 266 students. Samples were taken using cluster random sampling techniques to determine the experimental group and the control group which were then obtained grade IV in SD No. 2 Seminyak as an experimental class with 36 students and IVA SD No. 1 Legian as a control class of 31 people. Data collection for science knowledge competencies using 40 validated objective test instruments. The data obtained were then analyzed using the polled variance t-test. Based on data analysis, obtained t-count = 5,250> t-table = 2,000 at a significance level of 5% with dk = 65, so that H0 is rejected and Ha is accepted. If seen from the average value (means) of the science group's knowledge competency the experimental group is more than the control group that is 0,545 > 0,297. So, it can be concluded that there is a significant influence on the reciprocal teaching learning model assisted by flash card media on the science knowledge competence of the 4th grade students of SDN Gugus II Kuta in the academic year 2019/2020

Introduction

Education is needed to increase the quality of human resources to raise a developed and prosperous nation. Education can help someone to develop his potential. (Miskawati, 2019; Wirasasmita & Hendriawan, 2020) stated that education is a way to create the maturity of someone. One aspect that influences the education quality is a curriculum which has an important role as guidance in the learning process in class. This becomes a struggle for the government to revise every curriculum development which is now the Indonesian government has established the 2013 Curriculum (known as *Kurikulum 2013*) in all schools. The curriculum aims to plant and grow the students' potential in several fields (Andrian & Rusman, 2019; Febriyanti, 2013; Wisudawati & Sulistyowati, 2014). The roles of the teachers are needed in its implementation. A teacher has a big role in the implementation of the teaching and learning process, yet, problems appear in the learning process regarding the optimization of the classroom activities running.

The problem appears are mostly on the low science outcomes of the students (Patandung, 2017; Safitri, Kosim, & Harjono, 2019; Tarwiti, 2018). This problem also appears in one of the elementary schools. Based on the observation and the interview with the grade IV teacher in SDN Gugus II Kuta, it was found out that some students are difficult in the competency mastery of science. This problem was marked by the unattentive students in the learning process. This caused the lack of students' participation in class. Students were mostly talked with the other fellow students which made them unfocused. This was indicated as the result of the lack of variation and learning models given in the learning process which resulted in the one-way communication between the teacher and students. Besides, the lack of interesting learning media resulted in a lack of students' participation in the learning process. The vision of science subject does not only focus on preparing the students in continuing their education but also to give them chances to develop their curiosity for the natural and scientific objects to shape them in developing their knowledge (Puspitorini, Subali, & Jumadi, 2014; Redhana, 2019). Learning in class also becomes the main factor that supports the running of the science subject (Samatowa, 2016; Yuliati, 2017). Thus, the various innovations in providing materials can be focusing on the students as well as their attention seeker which builds their interest in a science subject.

One of the ways to tackle the problem is by implementing innovative learning. On the other hand, the use of the learning media is important to make the students easier in learning (Pramana, Jampel, & Pudjawan, 2018; Wulandari, Sudatha, & Simamora, 2020). One learning model innovation used is *reciprocal teaching* (Shoimin, 2018). *Reciprocal teaching* is a learning model which is in form of peer teaching. The research conducted by Andira, Santoso, & Yusup (2018) said that *the reciprocal teaching*-learning model can make the students more active which resulted in the students' increasing learning outcomes. The learning process activity is done systematically by the students in reciprocal teaching. The implementation of *reciprocal teaching* gives the students chances to learn material that will be discussed and create peer interactions between students (Firdaus, Darma, & Haryadi, 2014; Suparni, 2016). Based on the description, it can be concluded that *reciprocal teaching* is a learning activity that is conducted by teaching the material which will make the students act as the teachers in some of the learning activities to complete it. This model increases the students' activeness during the learning process. *Reciprocal teaching* has a certain characteristic that lets the students deliver the materials to their peers. Meanwhile, the teacher acts as the facilitator only who supervises the learning process. The learning process has four strategies such as question generating, clarifying, predicting, and summarizing. *Reciprocal teaching* has several advantages. Firstly, it allows the students to develop their creativity. Secondly, it can build cooperation between students. Thirdly, the students are motivated to study hard. Fourthly, it develops the students' integrity by appreciating others. Last but not least, it can be used on any occasion, for example in the limited learning materials or the tight ones (Shoimin, 2018; Yefrina & Miaz, 2019).

As a tool to attract attention and a supporting tool in the application of learning models, interesting, creative, and innovative learning media are needed. Media are all forms of tools that can be used in the process of providing information n learning models, learning media are needed (Azizah, Khuzaemah, & Rosdiana, 2017; Taqiya, Nuroso, & Reffiane, 2019). Media is an intermediary in sending messages to message recipients (Arsyad, 2019; Virgiana & Wasitohadi, 2016). Based on the explanation, it can be concluded that learning media is all intermediary tools that are used to transfer the learning material. In this case, the use of the right learning media can make the teachers are easier to teach. One of the learning media is a flashcard. A Flashcard is a learning media in a form of a card containing pictures and photographs (Kurniawati, 2019; Ristanti & Arianto, 2019). The implementation of *reciprocal teaching* which is combined with the flashcard will increase the interest and motivation of the students in following the learning activities.

This research aims at analyzing the influence of *reciprocal teaching*-learning assisted with flashcards towards the science knowledge competency of the grade IV elementary students. The research' novelty is put in the variables which this research' variable is *reciprocal teaching*-learning assisted with flashcard towards the science competency of the grade IV students of elementary school. It is expected that the learning model of *reciprocal teaching* assisted with the flashcard can increase the science competency of the grade IV elementary school.

Methodology

The setting of this research was in SD No. 2 Seminyak as the experiment class and SD No. 1 Legian as the control class. The research is experimental. The research was conducted using a quasi-experimental design which the non-equivalent group as the group design. The population of the research was all students of grade IV SDN Gugus II Kuta academic year 2019/2020. The population is in a form of 8 classes from 5 different schools which is a total of 266 students. The research used a random sampling technique. Random sampling is one technique used in choosing the sample which allows all students to have equal opportunities as the participant (Agung, 2014). All grade IV students who existed in SDN Gugus II Kuta have the same chances to be the samples. In determining the sample, a method can be used, namely the drawing technique. The technique was done by writing all fourth grade in all population on each paper containing 1 class and that means there were 8

papers and then the paper was rolled. Draw to get two classes. The results of the drawing were used as research samples and the two classes, namely SD No. 2 Seminyak as an experimental class and SD No. 1 Legian As the control class, it was given a pre-test. Then the score or results from the pre-test are used to equalize the sample class. The equivalence of the sample was analyzed using the t-test formula, namely the polled variance. The first step was to do the analysis prerequisite test, namely the data normality test and the variance homogeneity test. After that, the experimental group was given what they needed by learning the reciprocal teaching-learning model assisted by flashcard media, and the control group was taught using conventional learning.

Data regarding the competence of scientific knowledge of grade IV SDN Gugus II Kuta were used in this study. The technique used during the process of collecting data was the test method. The instrument used to collect science knowledge competency data was a test. In this study, using an objective test in the form of ordinary multiple choice. However, before the test was given to the student, the instrument was tested, namely the validity test, difference power, difficulty index, and reliability. The analysis used in this research was inferential statistical analysis. The normalized score gain data from the results of the pre-test and post-test were analyzed using inferential statistics. The analysis technique in this study used the polled variance formula used in the t-test used in this study. Hypothesis testing with t-test using the polled variance formula. Before conducting the t-test, the analysis prerequisite test was first carried out, namely the normality test of the data distribution and the homogeneity test of variance.

Result and Discussion

The data gain a score of the experimental group that was given treatment was given learning activities using the reciprocal teaching-learning model assisted by flashcard media which resulted in an average (means) of 0.541, a standard deviation of 0.214, a variance of 0.045, a maximum gain score of 1.00, and a gain score. a minimum of 0.154. The calculation of the PAN Scale of 5 Experimental groups found that the category of competence in the scientific knowledge of the experimental group was in a sufficient category. Meanwhile, the data gain score for the control group was given the treatment of learning activities using conventional learning. According to the presentation of the table, the mean (means) is 0.297, the standard deviation is 0.173, the variance is 0.030, the maximum score gain is 0.700, and the minimum score gain is 0.070. Meanwhile, the PAN Scale 5 control group found that the categorization was in sufficient categories.

Table 1. Recapitulation of Science Knowledge Competency Post-test Results

Statistik	Science Knowledge Competency	
	Experiment Group	Control Group
Means $\overline{X}$	0,541	0,297
Standard Deviation (S)	0,214	0,173
Varians (S^2)	0,045	0,030
Highest Score	1,00	0,700
Lowest Score	0,1544	0,070

One of the prerequisite tests for analysis was the normality test of data distribution using the Kolmogorov-Smirnov formula. The implementation of the normality test functions was to find out the distribution of data that were normally distributed or not normally distributed. The normality test of the experimental group data distribution obtained the maximum value | Ft-Fs | = 0.115 <the value of the Kolmogorov-Smirnov table = 0.221, then, the distribution of normalized gain score data for the experimental group was normally distributed. In the control group, the maximum value is | Ft-Fs | = 0.130 <the value of the Kolmogorov-Smirnov table = 0.238, then the distribution of the normalized score gain data for the control group is stated to be normally distributed.

Table 2. Results of Normality Test for Experiment Group and Control Group

No	Sample Group	Total Sample	Maximum Score $\lvert F_T - F_S \rvert$	Table Score *Kolmogorov-Smirnov*	Conclusion
1	Experiment Group	36	0,115	0,221	Normally Distributed
2	Control Group	31	0,130	0,238	Normally Distributed

The next step in the analysis prerequisite test was the variance homogeneity test. The function of doing the variance homogeneity test was to find out whether the variance was homogeneous or not. In the homogeneity test of variance, a formula is used, namely by using the F test (fisher). From the calculation results, the value of F-count = 1.509, that number is then compared with the F-table value with a significance level of 5% and dk = 65, so that the F-table = 1.79 can be obtained, therefore the data gain is normalized for each class is said to have a homogeneous variance.

Table 3. Varians Homogeneity Test

No	Sample	Variants	Dk	F_{count}	F_{table}	Conclusion
1	Experiment Class	0,045	35	1,509	1,79	Homogenous
2	Control Class	0,030	30			

After the analysis of the prerequisite test has been carried out, then the hypothesis test can be carried out using the t-test analysis used was the polled variance formula. The test criterion of the t-test was if T_ (count ≤ T_ (table)), it is stated that Ho was accepted. If T (count > T_ (table)), Ho was rejected. According to the results of the t-test analysis, the resulting T_ (count) = 5.063 with a significance level of 5% and dk = (36 + 31 - 2) = 65 obtained T table = 2,000. With the criteria T_ (count) = 5.063> T table = 2,000 therefore, Ho was rejected while Ha was accepted. So, it can be interpreted that there was a significant difference in the competence of science knowledge between groups of students who were taught using the reciprocal teaching-learning model assisted by flashcard media and groups of students who were taught using conventional learning.

Table 4. Hypothesis Test

No	Sample	N	dk	$\bar{X}$	S^2	T_{-count}	T_{-table}	Conclusion
1	Experiment Class	36	65	0,541	0,045	5,063	2,000	H_o rejected
2	Control Class	31		0,297	0,030			

(Source: Research Result Data)

From the data analysis competency knowledge of science that has been carried out, the average value in the experimental group is 0.545. Furthermore, the average normalized score gain for the competence of science knowledge in the experimental group is converted to the Norms Reference Assessment table (PAN) with a scale of 5 (five) known to be in the sufficient category. In the data analysis competency knowledge of science control group obtained an average value = 0.297. Furthermore, the normalized gain average score of competence in science knowledge of the control group is converted to the Norms Reference Assessment table (PAN) with a scale of 5 (five) known to be in the sufficient category. Based on the results of the calculation of the normalized gain score data competence in science knowledge, it shows that the average normalized gain score of the experimental group is more than the normalized gain score of the control group. Based on the analysis of these calculations, it can be concluded that the reciprocal teaching-learning model assisted by flashcard media affects the competence of science knowledge of fourth-grade students. This is influenced by several factors, namely as follows.

First, the *reciprocal teaching* assisted with the *flashcard* can increase the students' activeness in learning. *Reciprocal teaching* is an approach which trains the students in understanding the learning materials and give the explanation to their peers in the group (Efendi, 2013; Fitri, 2016). The learning model makes the students more active and creative in discovering a new idea thus they will be lead to problem-solving (Andira et al., 2018; Firdaus et al., 2014). The model teaches the students about four cognitive strategies which are carried out in groups which makes them understand the learning materials (Andira et al., 2018). The strategies cover the learning materials provided, summarize the materials which are important for students, make questions, predict and clarify. The strategy fits the scientific approach in the learning process which covers observing, questioning, collecting information, analyzing, and communicating (Ardaya, 2016; Jaedun & Nuryadin, 2017).

Secondly, the use of learning material was chosen to implement *reciprocal teaching.* Its implementation will not be perfect without interesting learning media, thus was chosen as a learning media which supports the learning process. Learning media can be used by the teacher to deliver material so the students are easier to get and understand the learning material (Muyaroah & Fajartia, 2017; Nursmasu, 2017). One of the learning media which can support the learning model of *reciprocal teaching* is *flashcard* media.

The research which was conducted by Andira et al., (2018) stated that the learning model of *reciprocal teaching* can increase the mathematical analysis of the students. The research was done by Firdaus et al., (2014) also stated that the learning model of *reciprocal teaching* can increase the motivation and analysis abilities of the

students. The research conducted by Ristanti & Arianto, (2019) stated that flashcards can attract the students to learning thus make the students are easier to understand the learning materials. In a nutshell, it can be concluded that the implementation of *reciprocal teaching* combined with the flashcard can add the students' interest in following the learning and can also add their motivation in following the students learning process.

Summary and Conclusion

The learning model *reciprocal teaching* assisted with *flashcard* influences the science knowledge of grade IV students in SDN Gugus II Kuta academic year 2019/2020. The learning model *reciprocal teaching* assisted with *flashcard*s increases the science knowledge competency of the students' in grade IV in elementary schools.

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